Claims

1. A nucleotide sequence of expression cassette OXY-1 of SEQ ID No. 1.
2. A modified staphylokinase SAK-2 gene of SEQ ID No. 2.
3. A peptide sequence of modified staphylokinase SAK-2 gene, of SEQ ID No. 3.
4. A plasmid pRM1 having International Deposition No. BPL-0019.
5. A plasmid pOXYSAK-1 having International Deposition No. BPL-0020.
6. A plasmid pOXYSAK-2 having International Deposition No. BPL-0021.
7. A recombinant *E. Coli* of International Deposition No. 5146, the International Depository is "Microbial Type Culture Collection" at Institute of Microbial Technology, Chandigarh, India, having a plasmid pRM1 of International Deposition No. BPL-0019.
8. A recombinant *E. Coli* of International Deposition No. 5147, the International Depository is "Microbial Type Culture Collection" at Institute of Microbial Technology, Chandigarh, India, having a plasmid pOXYSAK-1 of International Deposition No. BPL-0020.
9. A recombinant *E. Coli* of International Deposition No. 5148, the International Depository is "Microbial Type Culture Collection" at Institute of Microbial Technology, Chandigarh, India, having a plasmid pOXYSAK-2 of International Deposition No. BPL-0021.
10. A process for over-producing staphylokinase and its analogues by modulating level of oxygen of its growth medium in a host system, said method comprising steps of:
    a. preparing a piece of DNA carrying genetic information for the production of staphylokinase,
    b. modifying 10 amino-terminal residues of SAK encoding DNA, wherein Lys6 and Lys8 residues of SAK are changed to small neutral amino-acid residues,
    c. constructing DNA expression cassette OXY-1,
    d. integrating piece of DNA obtained at step (a) or step (b) with the OXY-1 to obtain pOXYPRO,
    e. transferring integrated product of step (d) on a plasmid vector to obtain plasmid construct pOXYSAK-1, and pOXYSAK-2 respectively,
    f. introducing the plasmid constructs of step (e) into a host systems,
    g. culturing the host cell for over-production of SAK or its derivatives under high aeration and changing level of oxygen below 5% of atmospheric oxygen level when cell growth reaches to exponential phase to obtain cell mass,
    h. lysing the cells of step (g) to separating cell lysate from the cellular debris, and thereby obtaining the staphylokinase and its analogues.

11. A process as claimed in claim 10, wherein the Lys6 and Lys8 residues of SAK are changed into small and neutral amino acid residues.
12. A process as claimed in claim 10, wherein the plasmid vector is a high or medium copy number plasmid.
13. A process as claimed in claim 10, wherein the host system is selected from a group comprising *E. coli, Bacillus,* and Yeast.
14. A process as claimed in claim 10, wherein the sequence of OXY-1 is modified depending upon the host system.
15. A process as claimed in claim 10, wherein the amino acids are selected from a group comprising Alanine, and Glycine.
16. A process as claimed in claim 10, wherein the growth medium is Luria Broth (LB) medium.
17. A process as claimed in claim 10, wherein culturing the host cell for over-production of SAK or its derivatives at shake flask culture or at fermentation.
18. A process as claimed in claim 17, wherein culturing the host cell till O.D. 600 reaches 0.6 to 0.7.
19. A process as claimed in claim 17, wherein fermentation is a two-stage fed-batch fermentation.
20. A process as claimed in claim 10, wherein obtaining the cell mass by centrifugation or filtration.
21. A process as claimed in claim 10, wherein lysing the cells by method selected from a group comprising sonication, chemical, and mechanics lysis.
22. A process as claimed in claim 10, wherein separating the cell lysate from the cellular debris by centrifugation.
23. A method of dissolving blood clot in a subject in need thereof, said method comprising step of administering pharmaceutically effective amount of streptokinase analogue SAK-2, optionally along with additive(s).
24. A method as claimed in claim 23, wherein the additive is selected from a group comprising nutrients consisting of proteins, carbohydrates, sugar, talc, magnesium stearate, cellulose, calcium carbonate, starch-gelatin paste, and/or pharmaceutically acceptable carrier, excipient, diluent, or solvent.
25. A method as claimed in claim 23, wherein the SAK-2 and additives are in a ratio ranging between 1:10 to 10:1.